General Characteristics

1. An industrial method of preparation of methanol is
(a) catalytic reduction of carbon monoxide in presence of $ZnO\text{-}Cr_2O_3$.
(b) by reacting methane with steam at 900 °C with a nickel catalyst
(c) by reducing formaldehyde with lithium aluminium hydride
(d) by reacting formaldehyde with aqueous sodium hydroxide solution (1984)

2. Wood alcohol is
(a) CH_3OH (b) C_2H_5OH (c) $CH_3CH_2CH_2OH$ (d) $(CH_3)_2CHOH$

3. Grain alcohol is
(a) CH_3OH (b) C_2H_5OH (c) $CH_3CH_2CH_2OH$ (d) $(CH_3)_2CHOH$

4. Rubbing alcohol is
(a) CH_3OH (b) C_2H_5OH (c) $CH_3CH_2CH_2OH$ (d) $(CH_3)_2CHOH$

5. Absolute alcohol is
(a) CH_3OH (b) C_2H_5OH (c) $CH_3CH_2CH_2OH$ (d) $(CH_3)_2CHOH$

6. The increasing order of boiling point of the given alcohols is
(a) 1-pentanol > 3-methyl-2-butanol > 2-methyl-2-butanol
(b) 1-pentanol > 2-methyl-2-butanol > 3-methyl-2-butanol
(c) 3-methyl-2-butanol > 2-methyl-2-butanol > 1-pentanol
(d) 2-methyl-2-butanol > 3-methyl-2-butanol > 1-pentanol

7. Which of the following sequences regarding the acidic nature of alcohols is correct?
(a) $CH_3OH > 1° > 2° > 3°$ (b) $CH_3OH < 1° < 2° < 3°$
(c) $1° > CH_3OH > 2° < 3°$ (d) $1° < CH_3OH < 2° < 3°$

8. The correct sequence regarding the Brönsted basicity of alcohols is
(a) $1° > 2° > 3°$ (b) $1° < 2° < 3°$ (c) $1° < 2° > 3°$ (d) $1° > 2° < 3°$

9. A 2° ROH can undergo
(a) via S_N1 nucleophilic substitution only (b) via S_N2 nucleophilic substitution only
(c) both S_N1 and S_N2 nucleophilic substitution (d) neither S_N1 nor S_N2 nucleophilic substitution

10. Hydrogen bonding is maximum in
(a) ethanol (b) diethylether (c) ethyl chloride (d) triethylamine (1987)

11. Which of the following alcohols is expected to have minimum boiling point?
(a) 1-Butanol (b) 2-Butanol (c) 2-Methyl-2-propanol (d) 1-Pentanol

12. The relative order of acidity of alcohols in comparison to H_2O and $HC{\equiv}CH$ is
(a) $H_2O > ROH > HC{\equiv}CH$ (b) $H_2O > HC{\equiv}CH > ROH$
(c) $ROH > H_2O > HC{\equiv}CH$ (d) $ROH > HCOOH > H_2O$

13. The relative order of basicity of conjugate bases is
(a) $OH^- < OR^- < HC{\equiv}C^-$ (b) $OH^- < HC{\equiv}C^- < OR^-$
(c) $HC{\equiv}C^- < OH^- < OR^-$ (d) $HC{\equiv}C^- < OR^- < OH^-$

14. Glycerine is a/an
(a) secondary alcohol (b) tertiary alcohol (c) ester (d) trihydric alcohol

15. Among the following compounds, the strongest acid is
(a) $HC{\equiv}CH$ (b) C_6H_6 (c) C_2H_6 (d) CH_3OH (1998)

16. The compound that will react most readily with NaOH to form methanol is
(a) $(CH_3)_4N^+I^-$ (b) CH_3OCH_3 (c) $(CH_3)_3S^+I^-$ (d) $(CH_3)_3CCl$ (2001)

Cleavage of R···OH Bond

17. The compound which reacts fastest with Lucas reagent at room temperature is
(a) 1-butanol (b) 2-butanol (c) 2-methylpropanol (d) 2-methylpropan-2-ol (1981)

18. HBr reacts fastest with
(a) 2-methylpropan-2-ol (b) propan-1-ol
(c) propan-2-ol (d) 2-methylpropan-1-ol (1984)

19. The compound which gives the most stable carbonium ion on dehydration is
(a) $CH_3-CH(CH_3)-CH_2OH$ (b) $CH_3-C(CH_3)_2-OH$
(c) $CH_3CH_2CH_2CH_2OH$ (d) $CH_3-CH(OH)-CH_2CH_3$ (1988)

20. Butanonitrile may be prepared by heating
(a) propyl alcohol with KCN (b) butyl alcohol with KCN
(c) butylchloride with KCN (d) propyl chloride with KCN (1992)

21. The order of reactivity of HX towards ROH is
(a) HI > HBr > HCl (b) HI < HBr < HCl (c) HI > HBr < HCl (d) HI < HBr > HCl

22. The order of reactivity of alcohols towards hydrogen halide is
(a) benzyl > 3° > 2° > 1° (b) benzyl < 3° < 2° < 1°
(c) 3° > 2° > 1° > benzyl (d) 3° > 2° > benzyl > 1°

23. The dehydration of 1-butanol gives
(a) 1-butene as the main product (b) 2-butene as the main product
(c) equal amounts of 1-butene and 2-butene (d) 2-methylpropene

24. The order of reactivity of the following alcohols

I: $FCH_2CH(OH)CH_3$ II: $FCH_2CH_2CH(OH)CH_3$ III: $CH_3CH(OH)CH_3$ IV: $PhCH_2OH$

towards concentrated HCl is
(a) I > II > III > IV (b) I > III > II > IV (c) IV > III > II > I (d) IV > III > I > II (1997)

25. 3, 3-Dimethyl-2-butanol, on reacting with concentrated HCl, gives
(a) 3,3-dimethyl-2-chlorobutane
(b) 2,3-dimethyl-2-chlorobutane
(c) a mixture of 3,3-dimethyl-2-chlorobutane and 2,3-dimethyl-2-chlorobutane.
(d) 3,3-dimethyl-1-chlorobutane

26. The reaction of neopentyl alcohol with concentrated HCl gives
(a) neopentyl chloride
(b) 2-chloro-2-methylbutane
(c) 2-methyl-2-butene
(d) a mixture of neopentyl chloride and 2-methyl-2 butene.

27. The reaction of neopentyl alcohol with $SOCl_2$ gives
(a) neopentyl chloride
(b) 2-chloro-2-methylbutane
(c) 2-methyl-2-butene
(d) a mixture of neopentyl chloride and 2-methyl-2-butene

28. The reaction of 3-buten-2-ol with aqueous HBr gives
(a) 3-bromo-1-butene only
(b) 1-bromo-2-butene only
(c) a mixture of 3-bromo-1-butene and 1-bromo-2-butene
(d) 4-bromo-1-butene.

29. The major product in the reaction of $PhCH_2CH(OH)CH(CH_3)_2$ with concentrated H_2SO_4 is
(a) $Ph(H)C{=}C(H)CH(CH_3)_2$ (Ph and $CH(CH_3)_2$ trans) (b) $Ph(H)C{=}C(H)CH(CH_3)_2$ (Ph and $CH(CH_3)_2$ cis... drawn with H trans to Ph)
(c) $PhCH_2(H)C{=}C(CH_3)_2$ (d) $Ph(CH_3)C{=}C(CH_3)_2$

30. HBr reacts fastest with
(a) $C_6H_5CH_2OH$ (b) $p\text{-}O_2NC_6H_4CH_2OH$ (c) $p\text{-}CH_3OC_6H_4CH_2OH$ (d) $p\text{-}ClC_6H_4CH_2OH$

31. HBr reacts slowest with
(a) $C_6H_5CH_2OH$ (b) $p\text{-}O_2NC_6H_4CH_2OH$ (c) $p\text{-}CH_3OC_6H_4CH_2OH$ (d) $p\text{-}ClC_6H_4CH_2OH$

32. In the reaction

$$H_3C-CH_2-CH(OH)-CH_3 \xrightarrow[-H_2O]{H^+} A \xrightarrow[CCl_4]{Br_2} C_4H_8Br_2 \text{ (5 products)}$$

Characteristic of Alcohols

49. In the Victor-Meyer test, blue colouration is shown by
(A) 1° alcohol (B) 2° alcohol (C) 3° alcohol (D) diol

50. Reaction of tertiary butyl alcohol with hot Cu at 350 °C produces
(A) butanol (B) butanal (C) 2-butene (D) 2-methylpropene

51. Lucas reagent is
(A) anhydrous $AlCl_3$ with concentrated HCl (B) anhydrous $ZnCl_2$ and concentrated H_2SO_4
(C) anhydrous $ZnCl_2$ and concentrated HCl (D) anhydrous $CaCl_2$ and concentrated HCl

52. The compound that does not react with Lucas reagent is
(A) *n*-butanol (B) *sec*-butyl alcohol (C) isobutyl alcohol (D) *tert*-butyl alcohol

53. In the Victor-Meyer test, red colouration is shown by
(A) 1° alcohol (B) 2° alcohol (C) 3° alcohol (D) phenol

54. In the Lucas test of alcohols, appearance of cloudiness is due to the formation of
(A) aldehydes (B) ketones (C) acid chlorides (D) alkyl chlorides

55. Which of the alcohols does not give iodoform test?
(a) $(CH_3)_2CH(OH)CH_3$ (b) $PhCH(OH)CH_2CH_3$
(c) 1-methylcyclohexanol (d) $CH_3CH_2CH(OH)CH_3$

56. 1-propanol and 2-propanol can be best distinguished by
(a) oxidation with alkaline $KMnO_4$ followed by reaction with Fehling solution.
(b) oxidation with acidic dichromate followed by reaction with Fehling solution.
(c) oxidation by heating with copper followed by reaction with Fehling solution.
(d) oxidation with concentrated H_2SO_4 followed by reaction with Fehling solution. (2001)

Ethers

57. Which of the following is expected to have the lowest boiling point?
(a) CH_3CH_2OH (b) CH_3CHO (c) CH_3COOH (d) CH_3OCH_3

58. Which of the following does not react with sodium metal?
(a) $CH_3CH_2OCH_2CH_3$ (b) CH_3OH (c) CH_3COOH (d) HCOOH

59. The heating of phenyl methyl ether with HI produces
(a) ethyl chloride (b) iodobenzene (c) phenol (d) benzene

60. The IUPAC amne of $CH_3CH_2OCH_2CH_2CH_3$ is
(a) diethyl ether (b) ethyl propyl ether (c) ethoxypropane (d) propoxyethane

61. The reaction $CH_3I + C_2H_5ONa \rightarrow CH_3OC_2H_5 + NaI$ is an example of
(a) Wurtz synthesis (b) Clemenson reaction (c) Williamson synthesis (d) Dow reaction

62. Which of the following compounds does not fit into the phenomenon of metamerism?
(a) $C_2H_5OC_2H_5$ (b) $CH_3OCH(CH_3)_2$ (c) $CH_3OCH_2CH_2CH_3$ (d) $CH_3CH_2CH_2CH_2OH$

63. The alkoxy group in benzene is
(a) *ortho* directing (b) *para* directing
(c) *ortho* and *para* directing (d) *meta* directing

64. The formation of peroxide linkage in ether due to the exposure in air can be detected by treating it with
(a) sodium
(b) dilute hydrochloric acid
(c) aqueous ferrous ammonium sulphate followed by addition of ammonium thiocynate
(d) dilute sodium hydroxide

65. The exposure of ether in air for a long time may cause
(a) oxidation to carboxylic acid (b) the formation of peroxide linkage
(c) oxidation to produce aldehyde or ketone (d) the degradation of the molecule

66. Ethers
(a) are soluble in concentrated acids
(b) are insoluble in concentrated acids
(c) have unpleasant smell
(d) have higher boiling point in comparison to the alcohol of comparable molecular mass

67. Given are the two cleavage reactions:
(i) $(CH_3)_3COCH_3 \rightarrow CH_3I + (CH_3)_3COH$
(ii) $(CH_3)_3COCH_3 \rightarrow CH_3OH + (CH_3)_3CI$
Which of the following statements is correct?
(a) The reagent used in reaction (i) is anhydrous HI in either and in reaction (ii) is concentrated HI
(b) The reagent used in reaction (i) is concentrated HI and in reaction (ii) is anhydrous HI in ether
(c) The reagent used both in reactions (i) and (ii) is concentrated HI
(d) The reagent used both in reactions (i) and (ii) is anhydrous HI in ether

68. The word epoxide represents
(a) cyclic ether (b) noncyclic ether (c) unsaturated ether (d) branched ether

69. The word oxiranes represents
(a) cyclic ether (b) noncyclic ether (c) unsaturated ether (d) branched ether

70. The correct order of bond angles H—O—H, CH_3—O—H and CH_3—O—CH_3 is
(a) H—O—H < CH_3—O—H < CH_3—O—CH_3 (b) H—O—H < CH_3—O—CH_3 < CH_3—O—H
(c) CH_3—O—H < H—O—H < CH_3—O—CH_3 (d) CH_3—O—H < CH_3—O—CH_3 < H—O—H

71. Starting materials for Williamson synthesis of an ether are
(a) RONa + R′OH (b) RONa + R′X (c) ROH + R′OH (d) ROH + R′X

72. The ether $(CH_3)_3COCH_3$ is cleaved with (i) anhydrous HI, and (ii) concentrated HI. The products obtained, respectively, are
(a) $CH_3I + (CH_3)_3COH$; $CH_3I + (CH_3)_3COH$ (b) $CH_3I + (CH_3)_3COH$; $CH_3OH + (CH_3)_3CI$
(c) $CH_3OH + (CH_3)_3CI$; $CH_3I + (CH_3)_3COH$ (d) $CH_3OH + (CH_3)_3CI$; $CH_3OH + (CH_3)_3CI$

73. Acid-catalysed reaction of proplene oxide with MeOH gives
(a) $CH_3CH(OH)CH_2OMe$ (b) $CH_3CH(OMe)CH_2OH$
(c) $CH_3CH(OH)CH_2OH$ (d) $CH_3CH(OMe)CH_2(OMe)$

74. The reaction of $(CH_3)_2C\overset{O}{—}CH_2$ (epoxide) with CH_3OH in (i) acid H^+, and (ii) base CH_3O^-, respectively, give
(a) $(CH_3)_2C(OCH_3)CH_2OH$ and $(CH_3)_2CH(OH)CH_2OCH_3$
(b) $(CH_3)_2C(OCH_3)CH_2OH$ and $(CH_3)_2C(OCH_3)CH_2OH$
(c) $(CH_3)_2C(OCH_3)CH_2OCH_3$ and $(CH_3)_2C(OH)CH_2OH$
(d) $(CH_3)_2C(OH)CH_2OH$ and $(CH_3)_2C(OCH_3)CH_2OCH_3$

75. Diethyl ether on heating with concentrated HI gives two moles of
(a) ethanol (b) ethyl iodide (c) iodoform (d) methyl iodide (1982)

Multiple Correct Choice Type

1. Which of the following alcoholas react with Lucas reagent at room temperature?
(a) CH_3CH_2OH (b) $CH_3CH(OH)CH_3$ (c) $(CH_3)_3COH$ (d) CH_3OH

2. Which of the following statements are **not** correct?
(a) The branched isomer of an alcohol has lower boiling point than the unbranched alcohol.
(b) Ethylene glycol boils at a temperature lower than that of ethanol.
(c) The hydroboration-oxidation process gives product corresponding to Markovnikov addition of water to the carbon-carbon double bond.
(d) The oxymercuration-demercuration process gives products corresponding to anti-Markovnikov addition of water to the carbon-carbon double bond.

3. Which of the following statements are correct?
(a) The addition of water to the carbon-carbon double bond via hydroboration-oxidation process does not involve any rearrangement of carbon skeleton.
(b) The rearrangement of carbon skeleton may occur during the conversion of alcohol into alkene.
(c) The rearrangement of carbon skeleton may occur during the conversion of alcohol into alkyl halide.
(d) The cleavage of carbon-oxygen bond in alcohols is catalyzed in the presence of an acid.

4. Which of the following statements are correct?
(a) The substitution of hydroxyl group by a halogen group in alcohol is an electrophilic substitution reaction.

(b) Alcohols are weak acids as well as weak bases.
(c) A secondary alcohol on oxidation gives a carboxylic acid containing the same number of carbon atoms.
(d) A primary alcohol on oxidation gives a carboxylic acid containing the same number of carbon atoms.

5. Which of the following statements are **not** correct?
(a) Tertiary butyl alcohol gives positive iodoform test.
(b) $CH_3CH_2-\underset{OH}{\overset{H}{C}}-CH_2CH_3$ gives positive iodoform test.
(c) The carbon-carbon bond in $R-\underset{OH}{\overset{H}{C}}-\underset{OH}{\overset{H}{C}}-R'$ can be broken by the use of periodic acid and the product obtained are two aldehydes.
(d) The carbon-carbon bond in $R-\underset{OH}{\overset{R'}{C}}-\underset{OH}{\overset{H}{C}}-R'$ can be broken by the use of periodic acid giving two aldehydes.

6. Which of the following statements are correct?
(a) The molecule $R\underset{OH}{CH}CH_2\underset{OH}{CH}R'$ is cleaved by HIO_4 giving RCHO and R′CHO.
(b) Tertiary alcohols are more readily dehydrated than the secondary alcohols.
(c) Tertiary butyl alcohol when passed over hot metallic Cu at 570 K produces isobutene.
(d) Primary alcohols show positive Lucas test.

7. Which of the following statements are **not** correct?
(a) Tertiary alcohols show positive Lucas test with slower speed than in the case of secondary alcohols.
(b) The order of increasing acidity amongst 1°, 2° and 3° alcohols is

$$1^\circ \text{ alcohol} < 2^\circ \text{ alcohol} < 3^\circ \text{ alcohol}$$

(c) The reaction of glycerol with small amount of HI produces 2–iodopropane.
(d) The reaction of glycerol with excess of HI produces 1, 2, 3-triiodopropane.

8. Which of the following statements are correct?
(a) β-Chloroethyl alcohol is a stronger acid than ethyl alcohol.
(b) Benzyl alcohol is a stronger acid than *p*-nitrobenzyl alcohol.
(c) The amount of HIO_4 consumed when it is treated with one mol of $\underset{OH}{CH_2}\underset{OH}{CH}CH_2OCH_3$ is 2 mol.
(d) The amount of HIO_4 consumed when it is treated with one mole of $CH_2OH(CHOH)_3CHO$ is 4 mol.

9. Which of the following statements are correct?
(a) An organic compound on treating with HIO_4 gives CH_3COCH_3 and HCHO. The compound is $CH_3-\underset{OH}{\overset{CH_3}{C}}-\underset{OH}{CH_2}$
(b) An organic compound on treating with HIO_4 gives 5HCOOH and one HCHO. The compound is $H_2\underset{OH}{C}(CHOH)_4\underset{OH}{CH_2}$.
(c) Thiols are less soluble in water as compared to the corresponding alcohols.

10. Which of the following statements are **not** correct?
(a) Absolute alcohol can be obtained by distillation of ethanol and water mixture.
(b) Cyclohexanol is more soluble in water than 1-hexanol.
(c) The hydration of 3-phenyl-1-butene in dilute H_2SO_4 produces 3-phenyl-2-butanol.
(d) The hydration of cyclobutylethene in dilute H_2SO_4 gives 1-cyclobutylethanol.

11. Which of the following statements are correct?
(a) Alcohol is slightly more acidic than water.
(b) The reaction of HBr with *n*-butanol follows S_N1 mechanism.
(c) The reaction of HBr with *t*-butyl alcohol follows S_N1 mechanism.
(d) (*R*)-2-Hexanol on reacting with concentrated HBr gives (*S*)-2-bromohexane.

12. Which of the following statements are correct?
(a) (*R*)-3-Methyl-3-haxanol on reacting with concentrated HBr gives excess of *S*-3-bromo-3 methylhexane.
(b) S_N1 nucleophilic substitution in ROH may lead to the rearrangement of carbon skeleton.
(c) S_N2 nucleophilic substitution in ROH not only brings inversion of geometry but also the rearrangement of carbon skeleton.
(d) 3-Pentanol reacts with HBr to give a mixture of 3- and 2-bromopentane. The reaction follows S_N1 nucleophilic substitution mechanism.

13. Which of the following statements are correct?
(a) The product of the reaction Ph_2CHCH_2OH with HBr gives $PhCHBrCH_2Ph$.
(b) The reaction of 1° or 2° ROH with PBr_3 proceeds with the inversion giving BrR.
(c) The correct decreasing order of dehydration of the given alcohols with H_2SO_4 is

$$(CH_3)_2C(OH)CH(CH_3)_2 > CH_3CH_2CH(OH)CH(CH_3)_2 > CH_3(CH_2)_4CH_2OH$$

(d) The rate of dehydration of $(CH_3)_2C(OH)CH(CH_3)_2$ with H_2SO_4 is faster than that $(CH_3)_2C(OH)CH_2CH_2CH_3$.

14. Which of the following statements are correct?
(a) The rate of dehydration of $CH_3CH_2CH(OH)CH_2CH_2CH_3$ with H_2SO_4 is faster than $CH_3CH_2CH(OH)CH(CH_3)_2$.
(b) The dehydration of cyclobutylmethanol gives cyclobutylethene.
(c) The decreasing order of reactivity of benzyl alcohol with HBr is

$$p\text{-}CH_3OC_6H_4CH_2OH > C_6H_5CH_2OH > p\text{-}ClC_6H_4CH_2OH > p\text{-}O_2NC_6H_4CH_2OH$$

(d) MnO_2 is a milder oxidising agent than $KMnO_4$.

15. Which of the following statements are correct?
(a) MnO_2 can be used for selective oxidation of OH group of allylic and benzylic 1° and 2° alcohols to give aldehydes and ketones, respectively.
(b) The oxidation of $CH_3CH{=}CHCH_2OH$ with MnO_2 gives CH_3CHO and OHCCHO.
(c) The oxidation of $PhCH_2OH$ with MnO_2 gives PhCHO.
(d) The oxidation of $PhCH(OH)CH_2CH_2OH$ with MnO_2 gives $Ph\underset{O}{\underset{\|}{C}}CH_2CHO$.

16. Which of the following statements are **not** correct?
(a) The reduction of $p\text{-}O_2NC_6H_4CH_2COOH$ with $LiAlH_4$ gives $p\text{-}O_2NC_6H_5CH_2CH_2OH$.
(b) The reaction of $Ph_2C{=}CHCH_3$ with BH_3 in tetrahydrofuran followed by H_2O_2/OH^- gives $Ph_2C(OH)CH_2CH_3$.
(c) Cyclopentylmethylcarbinol does not give iodoform test.
(d) An alcohol containing $-CH(OH)CH_3$ gives iodoform test.

17. Which of the following statements are correct?
(a) ROH is a stronger acid than RSH.
(b) The IUPAC name of $CH_3S^-Na^+$ is sodium methylmercaptide or sodium methanthiolate.
(c) ROH is a stronger base than RSH.
(d) The reaction $RSH + OH^- \rightleftharpoons RS^- + HOH$ lies far towards the left side.

18. Which of the following statements are **not** correct?
(a) The reaction $ROH + OH^- \rightleftharpoons RO^- + HOH$ lies far towards the left side.
(b) The reaction $ROH + R'S^-Na^+ \longrightarrow RO^-\ Na^+ + R'SH$ is feasible.

(c) RS^-, in a protic solvent, acts as a stronger nucleophile than RO^-.
(d) The bond angle R—O—H in methanol is smaller than that of R—S—H in methanethiol.

19. Which of the following statements are **not** correct?
(a) Ethanol vapour is passed over heated copper and the product is treated with aqueous sodium hydroxide. The final product is $CH_3CH(OH)CH_2CHO$.
(b) Aliphatic ethers are purified by shaking with a ferrous salt to remove peroxide which are formed on prolonged standing in contact with air.
(c) The catalyst octacarbonyldicobalt reduces the aldehyde RCHO to 2° alcohol.
(d) The treatment of CH_3CHO to RMgX followed by hydrolysis gives 1° alcohol.

20. Which of the following statements are **not** correct?
(a) The treatment of CH_3COCH_3 to RMgX followed by hydrolysis gives 2° alcohol.
(b) Alkenes react with mercuric acetate in the presence of water to give hydroxymercurial compounds which on reduction yield alcohols.
(c) Alkenes undergo hydroboration with diborane to yield alkyl boranes which on oxidation give alcohols.
(d) Hydroboration-oxidation of 1-butene gives isobutyl alcohol.

21. Which of the following statements are correct?
(a) Hydroboration-oxidation of 2-methyl-2-butene gives 3-methyl-2-butanol.
(b) The reaction of ethylene oxide with RMgX followed by hydrolysis gives RCH_2CH_2OH.
(c) The reaction $HC{\equiv}C^-\,Na^+ + ROH \rightarrow RO^-\,Na^+ + HC{\equiv}CH$ lies more to the right. From this, it follows that ROH is stronger acid than acetylene and $RO^-\,Na^+$ is a weaker base than $HC{\equiv}C^-\,Na^+$.
(d) The oxidation of an alcohol involves the loss of one or more hydrogen from the carbon bearing the —OH group.

22. Which of the following statements are **not** correct?
(a) The conversion of a primary alcohol to the aldehydic stage can be conveniently carried out by using the reagent alkaline $kMnO_4$.
(b) An alcohol giving positive iodoform test must contain the group $CH_3CH_2\underset{}{\overset{OH}{\overset{|}{C}H}}—CH_2—$.
(c) In the iodoform test perfomed by an alcohol, the first step is the oxidation of alcohol into ketone by sodium hypoiodite.
(d) The treatment of glycol with periodic acid gives HCHO.

23. Which of the following statements are **not** correct?
(a) The oxidation of $R—\underset{OH}{\underset{|}{C}H}—\underset{OH}{\underset{|}{C}H}—\underset{OH}{\underset{|}{C}H}—R'$ with HIO_4 gives the products RCHO + HCHO + R′CHO and the amount of HIO_4 consumed is two mol.
(b) The treatment of HIO_4 to 1,2-dihydrocyclohexane produces $OCH(CH_2)_4CHO$.
(c) The primary alcohols produce blue colour in the Victor-Meyer method.
(d) The secondary alcohols produce red colour in the Victor-Meyer method.

24. Which of the following statements are correct?
(a) The tertiary alcohols produce no colour in the Victor-Meyer method.
(b) An organic compound on treating with HIO_4 gives $OHC(CH_2)_4CHO$. The compound is (ring with OH, OH).
(c) An organic compound on treating with HIO_4 gives $HOOC(CH_2)_4CHO$. The compound is (ring with =O, OH).
(d) An organic compound on treating with HIO_4 gives 2HCOOH + 2HCHO. The compound is $\underset{OH}{\underset{|}{H_2C}}—\underset{OH}{\underset{|}{C}H}—\underset{OH}{\underset{|}{C}H}—\underset{OH}{\underset{|}{C}H_2}$.

25. The products of hydroboration-oxidation of $\begin{array}{c}Ph\\Me\end{array}\!\!>C{=}C<\!\!\begin{array}{c}H\\Me\end{array}$ produces

(a) $\begin{array}{c}Me\\HO—\!\!+\!\!—H\\H—\!\!+\!\!—Ph\\Me\end{array}$ (b) $\begin{array}{c}Me\\HO—\!\!+\!\!—H\\Ph—\!\!+\!\!—H\\Me\end{array}$ (c) $\begin{array}{c}Me\\H—\!\!+\!\!—OH\\Ph—\!\!+\!\!—H\\Me\end{array}$ (d) $\begin{array}{c}Me\\H—\!\!+\!\!—OH\\H—\!\!+\!\!—Ph\\Me\end{array}$

26. The products of hydroboratin – oxidation of $\begin{array}{c}Ph\\Me\end{array}\!\!>C{=}C<\!\!\begin{array}{c}Me\\H\end{array}$ produces

(a) $\begin{array}{c}Me\\HO—\!\!+\!\!—H\\H—\!\!+\!\!—Ph\\Me\end{array}$ (b) $\begin{array}{c}Me\\HO—\!\!+\!\!—H\\Ph—\!\!+\!\!—H\\Me\end{array}$ (c) $\begin{array}{c}Me\\H—\!\!+\!\!—OH\\Ph—\!\!+\!\!—H\\Me\end{array}$ (d) $\begin{array}{c}Me\\H—\!\!+\!\!—OH\\H—\!\!+\!\!—Ph\\Me\end{array}$

27. The treatment of $H_2C{=}CHCH_2CH_2OH$ with conc. HCl results into the formation of
(a) $H_2C{=}CHCH_2CH_2Cl$ (b) $\begin{array}{c}CH_2\\|\\CH_2\end{array}\!\!>CHCH_2Cl$
(c) $H_3CCH(Cl)CH{=}CH_2$ (d) $H_3CCH{=}CHCH_2Cl$

28. Which of the following alcohols show the iodoform test?
(a) CH_3OH (b) CH_3CH_2OH (c) $CH_3CH(OH)CH_3$ (d) $CH_3CH_2CH_2OH$

Linked Comprehension Type

1. Given are the two reactions

(I) $(CH_3)_3C—\underset{CH_3}{\underset{|}{C}H}—OH \xrightarrow{\text{conc. HCl}} P$

(II) $(CH_3)_3C—CH_2OH \xrightarrow{\text{conc. HCl}} Q$

(i) The reactions (I) and (II), respectively, proceed via
(a) S_N1 and S_N1 mechanisms (b) S_N1 and S_N2 mechanisms
(c) S_N2 and S_N1 mechanisms (d) S_N2 and S_N2 mechanisms

(ii) The products P and Q, respectively, are
(a) $(CH_3)_3C—\underset{CH_3}{\underset{|}{C}H}—Cl$ and $(CH_3)_3C—CH_2—Cl$ (b) $(CH_3)_2\underset{Cl}{\underset{|}{C}}—CH(CH_3)_2$ and $(CH_3)_3C—CH_2—Cl$
(c) $(CH_3)_2\underset{Cl}{\underset{|}{C}}—CH(CH_3)_2$ and $(CH_3)_2\underset{Cl}{\underset{|}{C}}—CH_2CH_3$ (d) $(CH_3)_2C—\underset{CH_3}{\underset{|}{C}H}—Cl$ and $(CH_3)_2\underset{Cl}{\underset{|}{C}}—CH_2CH_3$

(iii) The reactions I and II, respectively, follow
(a) first-order and first-order kinetics (b) first-order and second-order kinetics
(c) second-order and first-order kinetics (d) second-order and second-order kinetics

2. Given are the two reactions

(I) $n\text{-}C_4H_9OH + HBr \rightarrow C_4H_9Br + H_2O$

(II) $(CH_3)_3COH + HBr \rightarrow (CH_3)_3Br + H_2O$

(i) The reactions I and II, respectively, proceed via
(a) S_N1 and S_N1 mechanisms (b) S_N1 and S_N2 mechanisms
(c) S_N2 and S_N1 mechanisms (d) S_N2 and S_N2 mechanisms

(ii) The reactions I and II, respectively, follow

(a) first-order and first-order rate laws
(b) first-order and second-order rate laws
(c) second-order and first-order rate laws
(d) second-order and second-order rate laws

(iii) In both the reactions, the reactants react to give an intermediate, respectively, via

(a) reversible and irreversible steps
(b) reversible and reversible steps
(c) irreversible and reversible steps
(d) irreversible and irreversible steps

3. Oxiranes are synthesized by treating an alkene with an organic peroxy acid. This process is known as epoxidation. The highly strained three-membered ring in epoxide makes it much more reactive towards nucleophilic substitution than other ethers.

(i) The most commonly used peroxy acid is

(a) $CH_3-C(=O)-O-OH$
(b) $CH_3-CH_2-C(=O)-O-OH$
(c) $C_6H_4(NH_2)-C(=O)-O-OH$ (ortho-amino)
(d) $C_6H_4(Cl)-C(=O)-O-OH$ (meta-chloro)

(ii) The base-catalyzed ring opening of the epoxide is represented as follows.

$$H_2C\overset{O}{-}CHCH_3 + CH_3CH_2O^- \xrightarrow{CH_3CH_2OH} \text{P or/and Q}$$

where P is $CH_3CH_2OCH_2CH(OH)CH_3$ and Q is $CH_3CH(OCH_2CH_3)-CH_2OH$

Which of the following product(s) is/are obtained?

(a) P only
(b) Q only
(c) Equal mixture of P and Q
(d) Unequal mixture of P and Q

(iii) The acid-catalyzed ring opening of the expoxide is represented as follows.

$$H_2C\overset{O}{-}CHCH_3 + CH_3OH \longrightarrow \text{P or/and Q}$$

where P is $CH_3OCH_2CH(OH)CH_3$ and Q is $CH_3CH(OCH_3)CH_2OH$

Which of the following product(s) is/are obtained?

(a) P only
(b) Q only
(c) Equal mixture of P and Q
(d) Unequal mixture of P and Q

4. Oxiranes are synthesized by treating an alkene with an organic peroxy acid. This process is known as epoxidation. The highly strained three-membered ring in epoxide makes it much more reactive towards nucleophilic substitution than other ethers.

(i) In the reaction

$$(H_3C)HC{=}CH(CH_3) \;(cis) + RC(=O)-O-OH \longrightarrow \text{P or/and Q}$$

where P is (*cis*-2,3-dimethyoxirane) and Q is (racemic trans-2,3-dimethyloxirane pair). The product(s) obtained is/are

(a) P only
(b) Q only
(c) Equal mixture of P and Q
(d) Unequal mixture of P and Q

(ii) The reaction of C_6H_5MgBr with the oxirane $H_2C\overset{O}{-}CHCH_3$ may be represented as

$$C_6H_5MgBr + H_2C\overset{O}{-}CH\,CH_3 \xrightarrow[H^+]{EtOH} \text{P or/and Q}$$

where P is $C_6H_5CH_2CH(OH)CH_3$ and Q is $CH_3CH(C_6H_5)CH_2OH$

Which of the following product(s) is/are obtained?

(a) P only
(b) Q only
(c) Equal mixture of P and Q
(d) Unequal mixture of P and Q

(iii) The acid-catalyzed hydrolysis of an epoxide gives

(a) an alcohol (b) a glycol (c) an aldehyde (d) a ketone

Assertion and Reason Type

Given below are a few questions containing two statements. Based on the following key, answer correctly each question.

(a) Both statements are correct and Statement-2 is correct explanation of Statement-1.
(b) Both statements are correct and Statement-2 is not correct explanation of Statement-1.
(c) Statements -1 is correct and Statement-2 is incorrect.
(d) Statements-1 is incorrect and Statement-2 is correct.

	Statement-1	Statement-2
1.	Solubility of *n*-alcohol in water decreases with increase in its relative molar mass.	The relative proportion of the hydrocarbon part in alcohols increases with increasing molar mass which permits enhanced hydrogen bonding with water.
2.	Cyclopentylmethylcarbinol does not give iodoform test.	An alcohol containing a methyl carbinol with at least one H atom on the carbinol C gives iodoform test.
3.	1,4-Hexadien-3-ol is converted into a mixture of 3,5-hexadien-2-ol and 2,4-hexadien-1-ol when dissolved in H_2SO_4.	H_2SO_4 helps removing OH as H_2O generating a carbocation which involves rearrangement to yield conjugated diene. The addition of —OH gives desire results.
4.	RSH is a weaker acid than ROH.	O is more electronegative than S.
5.	RS^- attracts H^+ less strongly than RO^-.	The –ve charge on S in RS^- is more spread out than the –ve charge on O in RO^-.
6.	Thiols have lower boiling point than the corresponding alcohols.	Thiols are less polar and form weaker intermolecular H–bonds.
7.	Acid catalysed dehydration of *tert*-butanol proceeds faster than that of *n*-butanol.	The acid catalysed dehydration of an alcohol proceeds via the formation of a carbocation.

ANSWERS

Straight Objective Type

1. (a)	2. (a)	3. (b)	4. (d)	5. (b)	6. (a)	7. (a)
8. (b)	9. (c)	10. (a)	11. (c)	12. (a)	13. (a)	14. (d)
15. (d)	16. (a)	17. (d)	18. (a)	19. (b)	20. (d)	21. (a)
22. (a)	23. (b)	24. (c)	25. (b)	26. (b)	27. (a)	28. (c)
29. (b)	30. (c)	31. (b)	32. (b)	33. (a)	34. (c)	35. (b)
36. (a)	37. (c)	38. (b)	39. (a)	40. (b)	41. (b)	42. (d)

43. (a)	**44.** (b)	**45.** (c)	**46.** (d)	**47.** (a)	**48.** (b)	**49.** (b)
50. (d)	**51.** (c)	**52.** (a)	**53.** (a)	**54.** (d)	**55.** (b)	**56.** (c)
57. (d)	**58.** (a)	**59.** (c)	**60.** (c)	**61.** (c)	**62.** (d)	**63.** (c)
64. (c)	**65.** (b)	**66.** (a)	**67.** (a)	**68.** (a)	**69.** (a)	**70.** (a)
71. (b)	**72.** (b)	**73.** (a)	**74.** (a)	**75.** (b)		

Multiple Correct Choice Type

1. (b), (c) **2.** (b), (c), (d) **3.** (a), (b), (c), (d) **4.** (b), (d) **5.** (a), (b), (d)
6. (b), (c) **7.** (a), (b), (c), (d) **8.** (a), (d) **9.** (a), (c) **10.** (a), (c), (d)
11. (c), (d) **12.** (a), (b) **13.** (a), (b), (c), (d) **14.** (c), (d) **15.** (a), (c)
16. (a), (b), (c) **17.** (b), (c) **18.** (a), (b), (d) **19.** (c), (d) **20.** (a), (d)
21. (a), (b), (c), (d) **22.** (a), (b) **23.** (c), (d) **24.** (a), (b), (c), (d) **25.** (a), (c)
26. (b), (d) **27.** (a), (b), (c), (d) **28.** (b), (c)

Linked Comprehension Type

1. **(i)** (b) **(ii)** (c) **(iii)** (d) **2.** **(i)** (c) **(ii)** (d) **(iii)** (b)
3. **(i)** (d) **(ii)** (a) **(iii)** (b) **4.** **(i)** (a) **(ii)** (a) **(iii)** (b)

Assertion Reason Type

1. (c) **2.** (d) **3.** (a) **4.** (d) **5.** (a) **6.** (a) **7.** (b)















